 <p>Wrest Park, Silsoe, Beds MK45 4HS UK +44 (0) 1525 862518</p>	<p>Calibration of a Single Use pH sensor</p>	<p>Document Number: SAMPLE</p>
<p>Revision: (A)</p>	<p>Created Date: 23rd February 2015</p>	<p>Last Rev: 23rd Feb 2015</p>

Purpose

This document describes a procedure to calibrate a single use, glass, combination pH sensor mounted into a single use vessel. The calibration process will perform a single point pH calibration at approximately 7 pH.

Equipment


1. Calibrated laboratory pH meter and pH electrode with a means of displaying the electrode mV and pH measurement value.
2. Calibrated temperature meter.
3. pH sensor simulator.
4. A means of extracting a representative sample from the SU vessel.

Procedure

1. The SU pH sensor will have dehydrated during storage in the SU vessel. It will be necessary to rehydrate the pH electrode in order to obtain a stable pH measurement. Rehydration can be accomplished using media or any other acceptable aqueous based solution with a pH value between 6.5 and 7.5 pH. The use of purified water (WFI) is not recommended for rehydration.
2. Gently agitate the vessel during rehydration and calibration.
3. Control the temperature in the vessel to the normal operating temperature, (typically 37°C).
4. Do not sparge gasses during rehydration or calibration.
5. Leave the sensor immersed in the solution for at least 4 hours before attempting to calibrate the sensor. Longer rehydration periods may improve the initial stability of the pH measurement.
6. Whilst the electrode is rehydrating, connect a pH simulator to the on-line pH meter to be used to measure the SU pH sensor.
7. Use the pH simulator to apply a “golden calibration” to the on-line SU pH meter.
8. Disconnect the pH simulator and connect the SU pH electrode to the on-line SU pH meter.
9. Following the rehydration period, extract a suitable grab sample of the solution from the SU vessel and measure the pH and temperature of the sample using the laboratory pH/temperature meter. Ensuring the temperature compensation setting on the lab meter matches the temperature of the grab sample.
10. Note the displayed pH value of the SU pH sensor on the on-line pH meter.
11. Note the pH value, mV value and the temperature of the solution on the lab meter.
12. Apply a single point (offset) calibration on the on-line meter to equal the grab sample pH measurement. Ensuring the temperature compensation setting on the on-line meter is set to the vessel solution temperature.

Notes:

1. As soon as the grab sample leaves the vessel it will start to change (it will be cooling and could be absorbing CO₂). For best accuracy the adjustment of the on-line meter should be undertaken as soon as possible after taking the sample from the vessel.
2. Simulators apply a known mV value to the instrument they are connected too. The output from a pH electrode varies with temperature and pH simulators are designed to emulate this. It is essential to

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ensure the pH simulator temperature setting matches the on-line pH meter settings, in order to apply the correct “Golden Calibration” to the on-line meter.

3. Temperature has a significant effect on both the output from a pH sensor and also on the actual pH of the solution being measured. For best accuracy calibrate the on-line pH sensor at your operating temperature. When comparing on-line and off-line pH samples these should be at the same temperature.
4. Depending upon the length of the run it may be necessary to perform additional grab sample calibrations to the on-line meter (paragrah 9 – paragraph 12).